RECORDS OF ANOSTRACAN PHYLLOPODS IN NORTHEASTERN OHIO

RALPH W. DEXTER AND LESLIE E. SHEARY
Kent State University

Records of anostracan phyllopods (fairy shrimps) in Ohio and adjoining regions are not very plentiful. Chambers (1874) reported *Eubranchipus vernalis* from a temporary pool near Covington, Kentucky, a few miles from Cincinnati. Hunt (1882) listed *E. stagnalis* for the Cincinnati region. Garman (1924) described *E. neglectus* from Kentucky. Baker and Rosof (1927–1928), who studied spermatogenesis in fairy shrimps, collected their specimens of *E. vernalis* in the Columbus region.[1] Ward (1940) reported *E. vernalis* from several pools near Cincinnati during the spring of 1938. No published accounts of anostracan phyllopods are known to the writers for northeastern Ohio. For older records in the known distribution of Anostraca, consult Packard (1883), Johanson (1921, 1922) and Creaser (1930a). For recent records of these sporadic organisms in eastern North America, see Dexter and Ferguson (1943). The present paper is concerned with studies on the seasonal and geographic distribution of *Eubranchipus vernalis* (Verrill) in the northeastern section of Ohio.

Preliminary field collections were made of the anostracan phyllopods in the vicinity of Akron, Ohio, during the late winter and spring of the years 1938–40. During the winter and spring of 1941 a restudy of the Akron area was undertaken with the addition of several new stations making a total of 17 in Summit County. Of these 17, six stations contained populations of *E. vernalis*. One of these ponds is known to have contained this species in 1936, 1938–1940. Two others are known to have had *Eubranchipus vernalis* in 1940. In addition, a rather extensive survey was made of Portage County, involving the examination of 80 temporary pools and ponds. Of these 80, seven stations were found to contain *Eubranchipus vernalis*, the only species of anostracan found in the two counties. This species has been previously reported from Massachusetts, New York, Pennsylvania, New Jersey, Kentucky, Ohio, Indiana, Michigan, Illinois and Ontario. Hence, 13 ponds out of a total of 97 studied, or 13.4 per cent, were inhabited by this fairy shrimp. In all but four cases the population was rather large and more so than reported from Illinois and Ontario by Ferguson (1939). However, a single specimen only was taken from two of the pools. In both of these cases the collection was made near the end of the fairy shrimp season (April 8).

The presence of fairy shrimps in two ponds near Canton, thirty miles south of Portage County, was reported to us by Mr. Charles H. Kuehnle in 1940. Subsequent collections of *E. vernalis* were made there in the spring of 1940 and 1941. One of these ponds contained the largest population of fairy shrimp found in our studies. Other records were also reported from near Canton. These reports were investigated in 1942, and the findings will be published in a later paper. The presence of fairy shrimps near Wooster was also reported to the writers, but no specimens have been collected by them there.

E. vernalis was one of two species reported by Ferguson (1939) and Dexter and Ferguson (1943) from east central Illinois. The other species, *E. serratus*, the more abundant and widely distributed species there, which has also been reported from Missouri and Nebraska, was not found in our northeastern Ohio studies.

[1]The specimens were collected in a pond near the campus of Ohio State University. The university later bought the property and drained the pond. No other published records of *E. vernalis* are known for the vicinity of Columbus. Personal communication from Dr. R. C. Baker, Department of Anatomy, the Ohio State University.

One pool in Summit County contained specimens of *Eubranchipus vernalis* in the spring of 1940, but did not have them in 1941. It was also observed that they disappeared there early in the season of 1940, sometime before April 13. Apparently conditions were not favorable as the fairy shrimps continued for several weeks in all other pools which had them in this region, and reappeared abundantly in those pools the following year. No pool lacking fairy shrimps when examined in 1940 was found to contain them in 1941.

The geographic distribution can readily be seen by reference to figure 1. The distribution was widely spread and sporadic. In only two cases were fairy shrimps found in closely adjoining pools. In most cases pools having shrimps were surrounded by pools not having them.

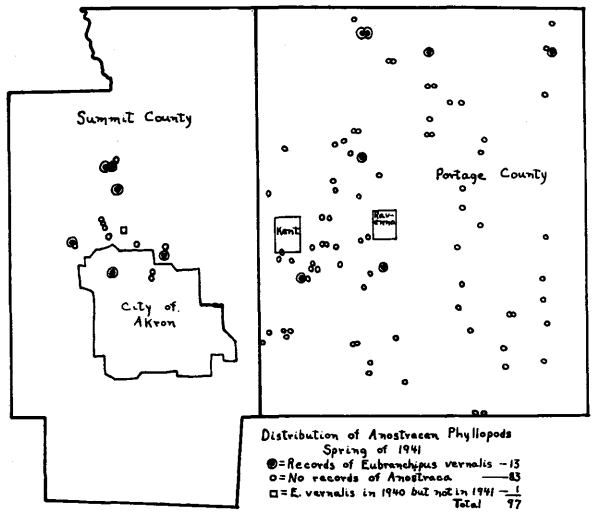

FIG. 1. Distribution of *Eubranchipus vernalis* in Portage and Summit Counties.

All specimens were collected in temporary pools or ponds of clear, cold water from winter rains and melted snow and ice. Metanauplii were collected with a plankton net, and adults with dip nets. Those pools which were frozen over during the early collections, and from which samples had to be taken through the ice, were revisited later after thawing for a more thorough sampling. Several stations containing phyllopods were visited every week until the fairy shrimp disappeared. Most of the pools were found in pastures and field corners and were of the typical "grassy" type as noted by Shelford (1913), but several were of the cattail type, and some were in ditches along roads and railroads (see figure 2 and cf. Dexter and Ferguson, 1943). Creaser (1929) found Eubranchipus most abundantly in woodland pools, and occasionally in pools which did not completely dry up. Mathias (1937) claimed that some phyllopods are found in permanent bodies of water. One of our collections came from a pond which very seldom dries up completely although a broad margin is dry each summer.

Ferguson (1935, 1939) reported *E. vernalis* in Ontario as being found only in the deeper pools. This may be due to the thick ice that sometimes forms in that region. Many of the Ohio records reported here are from shallow pools no more than one foot in depth. Two of the pools, on the other hand, were several feet deep, one having a depth of nearly five feet. Specimens were found in temper-

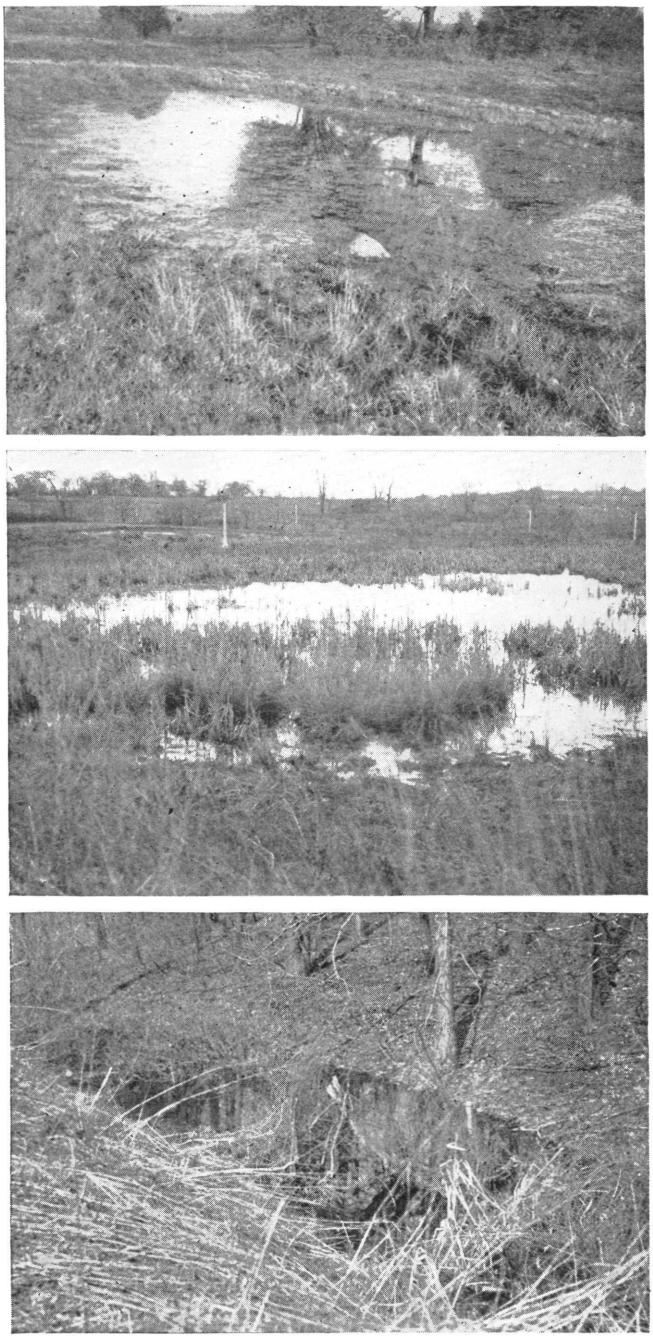

Fig. 2.
Typical grassy, cattail, and ditch type of fairy shrimp habitats.
(Photos by R. W. Dexter.)

atures ranging from 0° to 22° C. The senior author (ibid.) found *Eubranchipus serratus* in Illinois to tolerate water temperatures up to 23° C.

During night collecting it was discovered that *E. vernalis* is positively phototropic to the light of an ordinary flashlight, and that salamanders and leeches prey upon the fairy shrimps consuming large numbers. Creaser (1929) suggested that probably amphibians are important factors in controlling the numbers of fairy shrimps. Pearse (1913) and Mathias (1937) have listed the principle enemies of fairy shrimps to be tadpoles, frogs, salamanders, dytiscid, hydrophyllid, and gyrinid beetles, phryganeid caddis larvae, and water birds.

The winter of 1939–40 was cold and was followed by a late spring. The earliest record of metanauplii was taken on March 3; the earliest record of adults was taken on March 19. The latest collection was made on May 26. The winter of 1940–41 was mild, and was followed by an early spring. The earliest record of metanauplii was taken in mid-December; the first adults were collected on February 1. The latest collection was made on May 4. Several of the pools which had contained phyllopods were dried up by May 3 and 4, and all of the Portage County pools no longer contained specimens. Several of the deeper Summit County pools contained small but rapidly diminishing numbers. As in the case of the Illinois populations studied by the senior writer, a second or late brood was detected in many of the pools after the first population had reached maturity.

This study has demonstrated the same type of habitat and seasonal and geographical distribution of *E. vernalis* in northeastern Ohio as reported for *E. serratus* in east central Illinois. It shows again the sporadic nature of anostracan phyllopod distribution, the direct relation of temperature to life history and life span, and the influence of weather on seasonal occurrence.

The writers wish to thank Dr. M. S. Ferguson for a critical reading of the manuscript.

LITERATURE CITED

Baker, R. C. and J. A. Rosof. 1927–28. Spermatogenesis in *Branchipus vernalis*. Ohio Jour. Sci. 27: 175–183; 28: 50–68; 315–328.

Chambers, V. T. 1897. Our fresh water Entomostraca. Cincinnati Quart. Jour. Sci. 1: 22–26.

Creaser, E. P. 1929. The Phyllopoda of Michigan. Papers Mich. Acad. Sci., Arts, and Letters 11: 381–388.

1930a. Revision of the Phyllopod Genus Eubranchipus, with the description of a new species. Occas. Papers, Museum of Zool., Univ. of Mich. no. 208: 1–13.

1930b. The North American Phyllopods of the genus Streptocephalus. Occas. Papers, Museum Zool., Univ. of Mich., no. 217: 1–10.

Dexter, R. W., and M. S. Ferguson. 1943. Life history and distributional studies on *Eubranchipus serratus* Forbes. Amer. Midl. Nat. 29(1): 210–222.

Ferguson, M. S. 1935. Three species of Eubranchipus new to Canada. Canad. Field Nat. 49(3): 47–49.

1939. Observations on *Eubranchipus vernalis* in southwestern Ontario and eastern Illinois. Amer. Midl. Nat. 22(2): 466–469.

Garman, H. 1924. A new phyllopod Crustacean from Kentucky. Trans. Ky. Acad. Sci. 1: 85–87.

Hunt, J. H. 1882. List of microscopic articulata, etc. In Synopsis of Cincinnati Fauna. Cin. Soc. Nat. Hist. 5: 185–194.

Johanson, F. 1921. The larger freshwater Crustacea from Canada and Alaska. III. Euphyllopoda. Can. Field Nat. 35: 21–30; 92–94.

1922. Euphyllopoda Crustacea of the American Arctic. Rept. Can. Arctic Exped. 1913–18. Vol. 7, pt. G, 34 pp.

Mathias, Paul. 1937. Biologie des crustacés Phyllopodés. Actualites Scientifiques et Industrialles 447. 1–107.

Packard, A. S 1883. A Monograph of the Phyllopod Crustacea of North America with Remarks on the Phyllocarida. 12th Annual Rept. U. S. Geol. and Geog. Surv. of the Ter., 1878, Pt. I: 295–592.

Pearse, A. S. 1913. Observations of the behavior of *Eubranchipus dadayi*. Bull. Wisc. Nat. Hist. Soc. 10: 109–117.

Shelford, V. E. 1913. Animal Communities in Temperate America. Chicago. 368 pp.

Ward, E. B. 1940. A seasonal population study of pond Entomostraca in the Cincinnati region. Amer. Midl. Nat. 23(3): 635–691.